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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/616,106 | 07/14/2000 | Mark B. Solomon | SOL00-03 | 6526 |

7590 10/29/2003

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| EXAMINER |
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GARLAND, STEVEN R

| ART UNIT | PAPER NUMBER |
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2125

DATE MAILED: 10/29/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/616,106

Applicant(s)

SOLOMON, MARK B.

Examiner

Steven R Garland

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2125

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 July 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-62 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10,12-31,33-43,45-53 and 55-62 is/are rejected.
- 7) ☒ Claim(s) 11,32,44 and 54 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The abstract of the disclosure is objected to because the abstract must not exceed 150 words in length. Correction is required. See MPEP § 608.01(b).
2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.
3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1,16,17,21,22,37,38,42,53, and 62 are rejected under 35 U.S.C. 102(b) as being anticipated by Price " Deformable Mirror Multiplexer Driver Electronics Final Report " (cited by applicant).

Price teaches multiplexing a drive amplifier to multiple actuators of a deformable mirror DM, control of a deformable mirror shape, use of MOSFET switches and diodes, connecting a power amplifier to an electrode of the actuator and connecting the reference electrode through a switch to a reference node. See the entire article and note page 11 and figure 7.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3,18-20,24, and 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Price " Deformable Mirror Multiplexer Driver Electronics Final Report " .

Price teaches multiplexing a drive amplifier to multiple actuators of a deformable mirror DM, control of a deformable mirror shape, use of MOSFET switches and diodes, connecting a power amplifier to an electrode of the actuator and connecting the reference electrode through a switch to a reference node. See the entire article and note page 11 and figure 7.

Price however does not show connecting to an analog ground. Price also appears to show the use of P and N type MOSFET switches electrically coupled to the reference electrode and reference node.

It would have been obvious to one of ordinary skill in the art to modify Price to use a reference voltage of analog ground for ease in generating the reference voltage.

Further it would have been obvious to one of ordinary skill in the art to modify Price to use a pair of N and P type MOSFET switches to reduce leakage current. Also when electricity flows, it flows between the amplifier, MOSFETS, and reference node thus when it flows the drains and sources are electrically connected together.

7. Claims 2,4-10,12,13,15, 23,25-31, 33,34, 36,43,45-51, and 55-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Price " Deformable Mirror Multiplexer Driver Electronics Final Report " in view of Gullapalli 6,424,076.

Price teaches multiplexing a drive amplifier to multiple actuators of a deformable mirror DM, control of a deformable mirror shape, use of FET switches and diodes, connecting a power amplifier to an electrode of the actuator and connecting the reference electrode through a switch to a reference node. See the entire article and note page 11 and figure 7.

Price does not specifically show connecting different actuators to different amplifiers, use of a processor, use of addressing circuitry, or receiving data from an external source.

Gullapalli teaches connecting different actuators to different amplifiers, addressing circuitry, multiplexing, use of a processor, receiving data from an external system, providing commands to the amplifiers, current limiting, frame commands, and reducing power consumption. See the abstract, figures, col. 1, line 61 to col. 2, line 42; col. 5, line 10 to col. 6, line 59; col. 9, lines 24-48; and the claims.

It would have been obvious to one of ordinary skill in the art to modify Price in view of Gullapalli to use a processor, multiple amplifiers, addressing circuitry, current limiting, frame commands, and multiplexing so that an array of actuators in the deformable mirror could be easily controlled, prevent damage, allow ease in initially configuring the mirror and reduce power consumption.

8. Claims 14,35, and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Price "Deformable Mirror Multiplexer Driver Electronics Final Report" in view of Gullapalli 6,424,076 as applied to claims 2,4-10,12,13,15, 23,25-31, 33,34, 36,43,45-51, and 55-61 above, and further in view of Angelbeck et al. 4,091,274.

Price teaches multiplexing a drive amplifier to multiple actuators of a deformable mirror DM, control of a deformable mirror shape, use of FET switches and diodes, connecting a power amplifier to an electrode of the actuator and connecting the reference electrode through a switch to a reference node. See the entire article and note page 11 and figure 7.

Price does not specifically show connecting different actuators to different amplifiers, use of a processor.

Gullapalli teaches connecting different actuators to different amplifiers, addressing circuitry, multiplexing, use of a processor, receiving data from an external system, providing commands to the amplifiers, current limiting, frame commands, and reducing power consumption. See the abstract, figures, col. 1, line 61 to col. 2, line 42; col. 5, line 10 to col. 6, line 59; col. 9, lines 24-48; and the claims.

It would have been obvious to one of ordinary skill in the art to modify Price in view of Gullapalli to use a processor, multiple amplifiers, addressing circuitry, current limiting, frame commands, and multiplexing so that an array of actuators in the deformable mirror could be easily controlled, prevent damage, allow ease in initially configuring the mirror and reduce power consumption.

Price and Gullapalli however do not specifically state that the processor performs adaptive optics computations or teach the use of plural processors.

Angelbeck et al. teaches that a processor can perform adaptive optics computations. Angelbeck also teaches the use of plural processors. See the abstract;

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figures; col. 1, line 65 to col. 2, line 32; col. 3, line 11 to col. 4, line 46; and col. 5, line 51 to col. 6, line 52.

It would have been obvious to one of ordinary skill in the art to modify Price and Gullapalli in view of Angelbeck and use the processor to perform adaptive optics computations to provide a more compact system with increased flexibility.

Further it would have been obvious to one of ordinary skill in the art to modify Price and Gullapalli in view of Angelbeck and use plural processors this would allow ease in remote control of the system or allow division of the work tasks among simpler processors.

9. Claims 11,32,44, and 54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chapman et al. 5,986,795 is also of interest in deformable mirror control.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven R Garland whose telephone number is 703-305-9759. The examiner can normally be reached on Monday-Thursday from 6:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard, can be reached on (703) 308-0538. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-3900.

SR L

Steven R Garland
Examiner
Art Unit 2125

L P Picard

LEO PICARD
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100